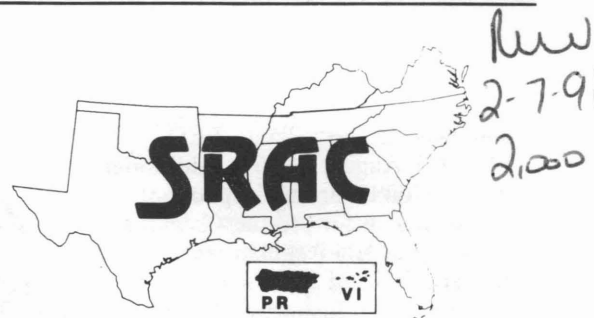




Texas  
Agricultural  
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Southern  
Regional  
Aquaculture  
Center



## Processed Catfish

Mississippi Cooperative Extension Service  
Food and Fiber Center\*

### Product Quality and Quality Control

Unlike the red meat and poultry processing industries, catfish processing does not fall under the regulations of the United States Department of Agriculture (USDA). Before a catfish processor begins operation, however, he must contact local county health officials to comply with county health regulations and to obtain a health permit. Catfish processing operations also must adhere to standards set forth by the Good Manufacturing Practice Code of Federal Regulations, Title 21, Part 110, and are subject to announced and unannounced inspections by the Food and Drug Administration (FDA).

As in other industries, the catfish industry considers quality a number one priority. Without a quality product, sales of catfish products would quickly decrease. In order to maintain a quality product and promote consumer confidence, the major commercial catfish processors have contracted voluntarily with National Marine Fisheries Service (NMFS) to have their plants

inspected. NMFS is an agency service of the National Oceanic and Atmospheric Administration (NOAA), an agency of the United States Department of Commerce (USDC). Federal inspectors with the NMFS perform unbiased, official inspections of plants, procedures and products for firms that pay for these services. The inspectors issue certificates indicating quality and condition of the catfish products.

The NMFS voluntary inspection program provides for the inspection of products and facilities and the grading of products.

Inspection is the examination of seafood (catfish) products by a U. S. Department of Commerce inspector or a cross-licensed State or U.S. Department of Agriculture inspector. They determine whether the product is safe, clean, wholesome and properly labeled. The equipment, facility and food-handling personnel must also meet established sanitation and hygienic standards. Products that pass inspection can display the federal inspection statement, "Packed Under Federal Inspection" or PUFI mark on the label and/or carton.

Grading is the added step after inspection in which the quality level is determined. Only products that have an established grade standard can be graded. Industry uses the grade standards to buy and sell products. Consumers, however, rely on grading as a guide to purchasing products of high quality. Graded products can bear a U.S. grade mark which shows their quality level. The "U.S. Grade A" mark indicates that the product is of high quality—that it is uniform in size, practically free of blemishes and defects, in excellent condition, and has good flavor and odor.

In addition to the contract inspection mentioned above, USDC performs other services. On request or on a regular contract basis, USDC conducts lot inspections of products to determine if they meet specifications of the party (buyers, brokers, distributors, etc.) that requested the inspection. USDC also has consultation services and provides assistance in specification development, label review, and analytical tests on products.

Detailed information regarding inspection requirements can be found in the Federal Standard Sanitation

\* Joe H. McGilberry, Virgil Culver, Gladden Brooks, Ken Hood, Stuart Dean, and Dixie LaBruyere.

Standards for Fish Plants, FED-STD-369, August 2, 1977. Additional information regarding inspection and standards for products is in the Code of Federal Regulations Title 50, parts 260 and 267. Figure 1 is an example of the Inspection Mark and the Grade Shield that would be displayed on catfish products that meet specific requirements. Products may have one or both of these symbols, depending upon the degree of inspection effort performed and the grade of the product.



Figure 1. The Federal inspection mark (top); the U.S. grade shield.

In early 1988 The Catfish Institute (TCI), in cooperation with the USDC and the NMFS, began a voluntary inspection program to insure and promote quality catfish products. Processors who meet the criteria set by this program are able to use TCI's registered trademarks, the Mississippi Prime name and logo (Figure 2), on their catfish products. To be able to use these trademarks, a processor must be licensed by TCI and can process only grain-fed channel catfish delivered live to the plant. The plant must be USDC certified as a "Sanitarily Inspected Fish Establishment". Weekly inspections to maintain this certification are required. In addition, weekly unannounced lot inspections by USDC are mandatory. "Evaluation of the



Figure 2. The Catfish Institute's Mississippi Prime logo.

processor includes maintaining high standards reflected by average monthly inspection scores and product testing to monitor the flavor, appearance and texture as well as to test levels of quality control at the processing plant."

In addition to Federal inspection, major commercial catfish processors have in-house quality assurance programs and are often inspected by quality assurance staffs from various customers.

Catfish processing quality control begins at the pond before the fish are harvested for processing. Off-flavor catfish is a major source of concern to catfish producers and processors. This condition is usually generated by minute amounts of chemicals produced from algae imbalance. Ideally, flavor checks on fish to be processed are done by qualified personnel 1 week before harvest, 1 day before harvest, and on the day of harvest.

### Basic procedures for quality control

The following is an overview of basic quality control procedures for catfish processing plants. Commercial processors with high quality catfish products have quality assurance programs that cover these areas in more detail.

- Fish should be checked for pesticide, herbicide and heavy

metal residue, as well as diseases and off-flavor.

- Holding tanks that are used to store live fish prior to processing should be kept free of algae growth, and proper levels of dissolved oxygen should be maintained. High quality water should be used.
- Proper cleaning procedures, including heading, eviscerating and skinning, should be conducted at all times. Periodic checks should be made at every location during the processing day.
- Proper offal removal procedures should be carefully monitored and maintained.
- A proper chilling procedure, using the latest chilling techniques, should be used to reduce and then maintain the temperature of the catfish at 38°F throughout processing.
- All surfaces in contact with the fish should be sanitary and not have contact with the floor.
- Fish dropped on floor should be handled in a proper manner using correct washing methods.
- Temperature of fish products to be frozen should be reduced to 0°F as quickly as possible and promptly stored in a freezer at -10 to -20°F.
- All work-in-process fresh inventory should be promptly iced and stored at approximately 34°F.
- Every effort should be made to keep bacteria counts low. Routine monitoring of product and equipment is encouraged.
- Frozen product should be stored properly in freezer.
- Freezer stock should be rotated regularly.
- Proper clean-up in plant is essential.

- Product should be checked throughout the processing operation with regard to weight, size, visual appearance, proper temperature and correct packaging.
- Value added products should be checked on line routinely to insure proper percentages of breading, glaze, marinade, etc.
- Product recall procedures, including proper coding of a product, should be used.

With the assistance of U.S. Department of Commerce inspection programs and in-depth quality assurance programs, today's commercial catfish processors are providing the consumer with quality catfish products.

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## Further Processing and Trends in the Industry

In many respects, the rapidly growing catfish processing industry has paralleled the more established poultry processing industry. For many years, dressed poultry was only a commodity product. When fast foods became convenient and popular, poultry made its first thrust into the further processing area. For example, Kentucky Fried Chicken® outlets provided breaded, cooked chicken parts at the fast food level. A similar movement has occurred in the catfish industry.

Although no national catfish chain rivals poultry product outlets, during the past few years many catfish "houses" or restaurants have served breaded catfish to the consumer.

### Processed products

Breaded, uncooked catfish fillets and whole fish emerged as the initial further processed product. Most of these products contain 20 to 30 percent cornmeal breading and usually are sold as a raw product to the institutional market. Sizes usually range from 3 to 7 ounces for fillets.

One potential product is a formed portion controlled product that is exact in shape, size and weight. This product is breaded and is excellent for school lunch programs. Products can be offered in 1- to 5-ounce portions. Breaded fillet strips also have

been a popular item for fast food outlets or restaurants.

A recent entry to the further processed area is an enrobed catfish product. The enrobing medium usually consists of vegetable oil or oil/water coatings that are applied to fillets which are then frozen. Many flavors and types have been presented, including lemon-butter, cajun and blackened. These types of coatings provide an up-scale catfish product suitable for baking or broiling at "white tablecloth" restaurants. Combinations of light coatings and bread crumbs are also available.

The use of phosphates as a processing aid has provided another area for new further processed products. The injector has provided a means of carrying flavors and spices to the core of catfish fillets. Products, such as lemon-butter, hot and spicy, and smoked fillets, can be prepared with this technology. Another method of carrying spices and flavors into the catfish is vacuum marination. Marination provides a vehicle to carry spices and flavors of larger particle size and heavier coatings to the surface and interior of fillets.

Many of the further processed catfish products have been packaged with suitable companion products such as hushpuppies. Presently, no fully cooked, frozen catfish products

are being prepared. Products of this nature have potential in the future.

Minced catfish, deboned from the skeletal frames after filleting, offers several opportunities for further processing. The minced meat is formed into patties and breaded. These patties have been successful for school lunch programs. The catfish mince can be frozen in 16-pound blocks for making breaded fish sticks, gumbo, or any product requiring fish in the recipe. Surimi has been successfully made from minced catfish.

A stuffed catfish fillet is almost certain to make an entrance into the marketplace. Stuffings could include crab and shrimp flavored surimi, shrimp stuffing, cornbread stuffing and many others.

Another opportunity for further processed products is the use of minced catfish in conjunction with other seafood products such as shrimp. Minced catfish often can be used in lieu of surimi. An example would be a formed, breaded shrimp product containing shrimp pieces and deboned catfish.

### Consumption increasing

The introduction of new products and/or new product forms has helped to increase consumption of catfish during the last several years.

In 1987 consumers ate approximately 190 million pounds of catfish, equivalent to .75 pounds per capita (a 23 percent increase from 1986). It is apparent that new products and new product forms of catfish are being accepted in the marketplace.

While this trend is indicative of a growing market for catfish products, additional research and development are needed to insure that quality products are introduced year after year--products that meet the expectations of health-conscious, nutritionally informed consumers.

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